APPLICATION FOR UNITED STATES LETTERS PATENT

FOR

Locator Based Assisted Information Browsing

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Locator Based Assisted Information Browsing

Related Application

This application is a continuation-in-part application to U.S. Patent Application

5   number 09/452,328, filed on November 30, 1999, entitled "Dynamic Content Based

Assisted Information Browsing". The specification of which is hereby fully

incorporated by reference.

BACKGROUND OF THE INVENTION

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1.   Field of the Invention

The present invention relates to the field of computerized information retrieval

and browsing. More specifically, the present invention relates to methods and

apparatuses associated with locator based assistance provided to facilitate

15   information retrieval and browsing.

2.   Background Information

With the recent advances in microprocessor, telecommunication and

networking technology, increasing number of computer systems are being

20   networked together through private and public networks, such as the Internet.

Volumes of information stored on information servers (such as web servers of the

World Wide Web) are now available to users of computer systems with a few clicks

of a mouse button. For many users, the ease of access has actually created an

information overload situation. An early solution has been to categorize as much of

25   the information available as possible, such as the directory or index services offered

by Internet portals like Yahoo and Lycos. Even then, a simple search restricted to

one categorization could still result in hundreds of potential hits, requiring a large amount of user time to sort out the useless from the useful. As a result, users are frustrated, and information technology is prevented from realizing its full potential in reaching the ubiquitous state.

5   Various automated techniques in assisting a user in retrieving and browsing information have been proposed and/or experimented. In U.S. Patent 5,727,129, entitled "Network system for profiling and actively facilitating user activities", issued to Barrett et al, a system and method for assisting a user in accessing information stored at remote network sites was disclosed. Under Barrett, an archive is

10   maintained of remote sites accessed and instances in which the same remote sites are accessed in sequence. Statistics regarding information such as the number of times a site has been accessed, and the times a given set of sites have been accessed in sequence are maintained. Based on this information, information items are identified which the user is predicted to be likely to want to access. In U.S.

15   Patent 5,960,429, entitled "Multiple reference hotlist for identifying frequently retrieved web pages", issued to Peercy et al, a method and apparatus for locating web pages was disclosed. Under Peercy, a count of retrievals of a web page is accumulated and the accumulated count and an address for the web page are stored in a record of a history log database. A multiple reference hotlist is formatted

20   for the user from the records in the history log.

Additionally, in co-pending application number 09/452,328, entitled "Dynamic Content Based Assisted Information Browsing", filed on November 30, 1999, presently assigned to the same assignee, a method for providing information browsing assistance based on the contents of the information being browsed is

25   disclosed.

Each of these techniques has its pros and cons. Additional techniques that can improve the ease of information retrieval and browsing, even in limited circumstances, with lesser demands on processing power, are nevertheless still desired.

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SUMMARY OF THE INVENTION

An automated method including automatic conditional provisioning of replacement and/or additional information display for assisting a user of the client

5   system in retrieving and browsing information is disclosed. Under the method, in response to the retrieval and display on a display of a client system a first information page, the assistance display is conditionally provided automatically. The automatic conditional provisioning is based at least in part on the locator of the first information page, employing a number of locator based conditions. In one

10   embodiment, the locator based conditions are URL patterns specifying families of URLs. In one embodiment, the replacement/additional information pages may contain identifiers/locators for related information pages.

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BRIEF DESCRIPTION OF DRAWINGS

The present invention will be described by way of exemplary embodiments, but not limitations, illustrated in the accompanying drawings in which like references

5   denote similar elements, and in which:

Figure 1 illustrates an overview of the present invention;

Figure 2 illustrates a browser and the augmented locator (URL) based assistance function and data structure of **Fig. 1** in further detail, in accordance with one embodiment;

10   **Figures 3a-3c** illustrate a number of example locators (URLs), locator based conditions (URL patterns) that encompass the example locators (URLs), and an XML like specification scheme for specifying assistance to be provided (URL Triggers) for the locator based conditions (URL patterns), in accordance with one embodiment;

15   **Figure 4** illustrates a locator based condition (URL pattern) data structure for storing locator based conditions (URL patterns), in accordance with one embodiment;

Figure 5 illustrates the relevant aspect of the operational flow of the analyzer function of **Fig. 2**, in accordance with one embodiment;

20   **Figures 6a-6b** illustrate a number of alternative dispositions of the analyzer function and locator based condition data structure for practicing the present invention, in accordance with two embodiments; and

Figure 7 illustrates an example digital system suitable for practicing the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

As summarized, the present invention includes methods and apparatuses for providing information browsing assistance, based on the locators of information

5   pages requested. In the following description, various aspects of the present invention will be described. However, the present invention may be practiced with only some or all aspects of the present invention. For purposes of explanation, specific numbers, materials and configurations are set forth in order to provide a thorough understanding of the present invention. However, the present invention

10   may be practiced without the specific details. In other instances, well known features are omitted or simplified in order not to obscure the present invention.

Parts of the description will be presented using terms such as locators, identifiers, functions, data structures and so forth, commonly employed by those skilled in the art to convey the substance of their work to others skilled in the art.

15   Parts of the description will be presented in terms of operations performed by a computer system, using terms such as parsing, accessing, retrieving, and so forth. As well understood by those skilled in the art, these quantities take the form of electrical, magnetic, or optical signals capable of being stored, transferred, combined, and otherwise manipulated through mechanical, electrical and optical

20   components of a digital system. The term digital system includes general purpose as well as special purpose data processing machines, systems, and the like, that are standalone, adjunct or embedded.

Various operations will be described as multiple discrete steps performed in turn in a manner that is most helpful in understanding the present invention,

25   however, the order of description should not be construed as to imply that these operations are necessarily order dependent, in particular, the order the operations

are presented. Furthermore, the phrase "in one embodiment" will be used repeatedly, however the phrase does not necessarily refer to the same embodiment, although it may.

5   Overview

Referring now to **Figure 1**, wherein an overview of the present invention, in accordance with one embodiment, is shown. As illustrated, for the embodiment, in accordance with the present invention, browser **100** is augmented with at least an information browsing assistance function **102** and a complementary data structure

10   **104** to conditionally provide locator based information browsing assistance to a user retrieving and browsing information pages **106**. More specifically, assistance function **102** and data structure **104** enable browser **100** to facilitate augmented conditional provisioning of replacement and/or additional complementary information pages **108**, when corresponding locator based conditions are met. That is, the

15   assistance information pages may be provided as replacement information pages (replacing the requested information pages) or additional information pages (complementary to the requested information pages). Further, in various embodiments, one or more of the replacement/additional complementary information pages **108** may include suggestions (having associated information

20   source identifiers) of additional information pages.

Information pages **106-108** represent a broad range of informational units known in the art, including but not limited to information "documents" formed using mark-up languages, such as HTML and XML.

In one embodiment, the locators of the information pages are Uniform

25   Resource Locators (URL) as specified by RFC2396 of the Internet Engineering Task Force, and the locator based conditions are URL based conditions. That is,

information browsing assistance is provided if a pre-specified URL condition (having associated information browsing assistance to be provided) is met. As will be described in more detail below, in various embodiments, each of the URL conditions is expressed as an URL pattern (implicitly) specifying a family of URLs, and the

5 associated information browsing assistance to be provided (when one of the implicitly specified URLs is requested), to be described more fully below referencing **Fig. 3a-3c.**

Browser Architecture

10   **Figure 2** illustrates augmented browser **100** in further detail, including its relation with information browsing assistance function **102** and complementary data structure **104**, in accordance with one embodiment. As illustrated, browser **100** includes conventional elements found in many browsers known in the art, HTTP interface **262**, HTML web page handler **264**, JAVA^{TM} and JavaScript execution

15 engine **266**, other script interpreter **268** (e.g. CGI), display interface **270**, and a number of "plug-ins" (or add-ons), shown as additional ActiveX components **272-274**. Included among these ActiveX components **272-274** is monitor function **272** of assistance function **102** responsible for interfacing with analyzer function **282** of assistance function **102**. In other words, for the embodiment, assistance function

20 **102** is distributively implemented with monitor function **272** being added to or integrated with browser **100**.

     Monitor function **272** registers itself with browser **100** to be notified of various browsing events of interest. In one embodiment, these browsing events of interest include in particular when browser **100** requests for information pages (e.g. in

25 response to directions from a user). Upon receipt of these notifications, monitor

function **272** relays the occurrence of these events to augmented assistance function **102**.

In alternate embodiments, browser **100** may be equipped with the capabilities to interface with analyzer function **282** directly. In other embodiments, analyzer function **282** may also be integrated with browser **100** instead.

Data structure **104** stores the locator based conditions. As alluded to earlier, for the earlier described URL based embodiments, data structure **104** stores the URL patterns. In one embodiment, data structure **104** is a tree-like data structure, with different portions of a URL pattern store in corresponding nodes of the tree-like data structure, and the leaf node of these nodes storing the associated information browsing assistance to be provided, to be described more fully later referencing **Fig. 4.**

In one embodiment, an editor (not shown) is provided to facilitate entry of the URL patterns into data structure **104**. In another embodiment, the URL pattern may be specified using pre-determined language elements (e.g. XML), and a reader (not shown) capable of comprehending the pre-determined language elements is provided to read the specified URL patterns (expressed using the pre-determined language elements), and store the specified URL patterns in data structure **104**.

Augmented assistance function **102**, more specifically, analyzer function **282**, (as described in more detail below referencing **Fig. 5**), is equipped to determine whether a locator of a requested information page satisfies one of the pre-specified locator based conditions stored in augmented data structure **104**. For the earlier described URL based embodiment, analyzer function **282** is equipped to determine whether the URL of a requested information page matches one of the pre-specified URL patterns stored in augmented data structure **104**.

Locator, Locator Based Conditions and Associated Browsing Assistance

Figure 3a illustrates a number of example locators of information pages **300**, more specifically, example URLs of information pages, in accordance with one embodiment. Example URLs **302** and **304** identify a "news" page each, available

5 from the portals "msnbc" and "yahoo" respectively. Similarly, example URLs **306** and **308** identify a "sports" page each, available from the portals "msnbc" and "yahoo" respectively. Example URLs **310** and **312** identify a result page each, to be returned in response to a search having the keyword "dog", available from the search engines "google" and "altavista" respectively.

10 Of course, as those skilled in the art will appreciate that example URLs **306** and **308** could be considered as identifying a "news" page each. In other words, the classification or differentiation of "sports" as a special category of "news" is arbitrary and application dependent. Further, from the description to follow, those skilled in the art will appreciate that the present invention may be practiced with a wide range

15 of other similar locators or URLs.

Figure 3b illustrates a number of example locator conditions **320**, more specifically, example URL patterns that encompass the above example locators or URLs, in accordance with one embodiment. As illustrated, locator conditions or URL patterns **322** and **324** having the keyword "news" placed at the illustrated

20 positions encompass the earlier described example locator or URL **302** and **304** respectively, and other news oriented information pages identified by locators/URLs of like kinds. An asterisk in locator condition or URL pattern **322/324** stands for a "wildcard" that may be satisfied by any value in the corresponding position of a locator/URL. In other embodiments other characters may be used in locator

25 conditions to represent wildcard characters or specific matching behaviors. Pattern matching algorithms familiar to those skilled in the art such as regular expressions

may also be employed. Similarly, locator conditions or URL patterns **326** and **328** having the keyword "SPTs" or "sports" placed at the illustrated positions encompass the earlier described example locator or URL **306** and **308** respectively, and other sports oriented information pages identified by locators/URLs of like kinds. Locator

5 conditions or URL patterns **330** and **332** having the keyword "q=dog" placed at the illustrated positions encompass the earlier described example locator or URL **310** and **312** respectively, and other result information pages identified by locators/URLs of like kinds. Accordingly, each of locator conditions or URL patterns **320** implicitly identifies a family locators or URLs.

10 Assuming in each of these situations, i.e. for each locator or URL that satisfies these locator based conditions or URL patterns **322-332**, the associated assistance is a corresponding assistance information page from a "help" web site "mysite", the associated assistance may be specified using an XML like specification language, in accordance with one embodiment, as illustrated. For example, the

15 "news" oriented assistance information page to be displayed from "mysite.com" when URL patterns **322-324** are met or matched, may be specified through URL trigger **340** enumerating the "news" information page to be displayed from "mysite.com". URL trigger **340** comprises URL patterns **342-344**, denoting the conditions under which the specified assistance is to be provided. For the

20 embodiment, the URL patterns and the assistance to be triggered are specified using the XML like statements illustrated. Similarly, the "sports" oriented assistance information page to be displayed from "mysite.com" when URL patterns **326-328** are met or matched, may be specified through URL trigger **360** enumerating the "news" information page to be displayed from "mysite.com". URL trigger **340** comprises

25 URL patterns **342-344**, denoting the conditions under which the assistance is to be provided. The "dog" oriented assistance information page to be displayed from

"mysite.com" when URL patterns **330-332** are met or matched, may be specified

through URL trigger **380** enumerating the "dogs" information page to be displayed

from "mysite.com". URL trigger **380** comprises URL patterns **382-384**, denoting the

conditions under which the assistance is to be provided. The described

5   relationships in these examples are merely illustrative, and those skilled in the art

will recognize that the scope of the present invention includes logical relationships

between location conditions and URL triggers that are based on more than simple

subject matches. In some embodiments, analyzer logic 282 may use arbitrarily

complex decision factors to map an URL pattern to an appropriate assistance

10   information page.

Even though only a handful of example locators, locator based conditions

and associated assistance are illustrated, as alluded to earlier, those skilled in the

art will appreciate the illustrated manner of specifying locator based conditions and

the assistance to be provided may be practiced for a wide range of locators.

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Locator Based Condition (URL Pattern) Data Structure

Figure 4 illustrates a locator based condition (URL pattern) data structure

suitable for use to store locator based conditions (URL patterns) to practice the

present invention, in accordance with one embodiment. As illustrated, for the

20   embodiment, locator based condition or URL pattern data structure **104** is a tree like

data structure comprising a number of nodes, e.g. nodes **402-414**. Nodes **414** are

said to be leaf nodes of predecessor nodes, such as nodes **402-410**. The various

portions of a locator based condition or a URL are stored in corresponding nodes.

For example, the various portions of URL pattern **302** are stored in corresponding

25   nodes **402-410**, whereas the various portions of URL **304** are stored in nodes **402**

and **410**. Child node or URL Trigger **414** specifies the assistance or URL action to

be triggered when the locator of a requested information satisfies the URL condition or matched the URL pattern.

As will be described in more detail below, in one embodiment, assistance function **102**, more specifically, analyzer function **282** determines whether the

5   locator or URL of the requested information page satisfies a locator based condition or matches a URL pattern by traversing the tree like data structure **104**.

Operational Flow of Assistance Function

Figure 5 illustrates the relevant aspects of the operational flow of assistance

10   function **102** (more specifically, analyzer function **282**), in accordance with one embodiment. As illustrated, upon receipt of a notification of an information page request event from monitor function **272**, block **502**, analyzer function **282** determines if one of the locator based conditions is met, block **504**. For the earlier described embodiment, where the locator based conditions are URL patterns, and

15   the URL patterns are stored in a tree like data structure **104**, analyzer function **282** traverses the tree like data structure **104** to determine if one of the URL patterns is met.

If locator based condition (URL pattern) is not met, for the embodiment, no information browsing assistance is provided. However, if one of the locator based

20   condition (URL pattern) is met, analyzer function **282** causes the corresponding information browsing assistance to be provided, block **506**. As described earlier, for the URL pattern embodiment, in particular, the embodiment where the URL patterns are stored in a tree like data structure, the assistance is specified in the leaf node of the nodes storing the matching URL pattern.

25   Further, these assistance may take the form of one or more replacement information pages and/or one or more additional complementary information pages.

Whether replacement or additional information pages are provided, one or more of the assistance information page may comprise information source identifiers identifying information pages of potential interest (in view of the information page being requested).

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Disposition of Analyzer Function and Condition Data Structure

Figures 6a-6b illustrate two alternative dispositions of assistance function **102** and condition data structures **104**, both suitable for practicing the present invention, in accordance with two embodiments. The embodiment of **Fig. 6a**

10 represents an embodiment, where all the relevant earlier described elements, i.e. monitor function **272**, analyzer function **282**, and data structure **104** are all provided to a client system **602** coupled to a network (e.g. the Internet). These relevant elements may be loaded onto client system **602** via a distribution medium (not shown) or downloaded from a distribution server (not shown).

15 The embodiment of **Fig. 6b** represents an alternate embodiment, where only monitor **272** is provided to a client system **602** coupled to a network (e.g. the Internet). Otherwise, analyzer function **282** and data structure **104** are disposed on portal or service server **604** instead. During operation, upon being notified of a request for an information page, monitor function **272** notifies analyzer function **102**

20 via the coupling network. The notification may be accomplished using any one of a number communication protocols known in the art. Analyzer function **282**, using data structure **104**, would perform the analysis, and if appropriate, triggers the information browsing assistance for client system **602** remotely from server **604**. Similarly, monitor function **272** may be loaded onto client system **602** via a

25 distribution medium (not shown) or downloaded from a distribution server (not

shown). In selected embodiments, server **604** may also assume the role of the distribution server.

Example Computer System

5   **Figure 7** illustrates one embodiment of an exemplary digital system suitable for use to practice the present invention, either as a client system or a server system. As a client system, digital system **700** may be a desktop computer system, a laptop computer system, a palm sized computing device, a wireless mobile phone, a set-top box, an Internet appliance and the like. As a server, digital system **700**

10   may a single or a cluster of computer systems. As shown, exemplary digital system **700** includes one or more processors **702** and system memory **704**. Additionally, system **700** includes mass storage devices **706** (such as diskette, hard drive, CDROM and so forth), input/output devices **708** (such as keyboard, cursor control and so forth) and communication interfaces **710** (such as network interface cards,

15   modems and so forth). The elements are coupled to each other via system bus **712**, which represents one or more buses. In the case of multiple buses, the buses are bridged by one or more bus bridges (not shown). Each of these elements performs its conventional functions known in the art. In particular, system memory **704** and mass storage **706** are employed to store a working copy and a permanent

20   copy of the programming instructions implementing the teachings of the present invention. The permanent copy of the programming instructions may be loaded into mass storage **706** in the factory, or in the field, as described earlier, through a distribution medium (not shown) or through communication interface **710** (from a distribution server (not shown). The constitution of these elements **702-712** are

25   known, and accordingly will not be further described.